A Filter to Eliminate Alternator Whine

An easy method of quieting your mobile rig.

by Bruce Hammond AA8HS

Alternators and other electrical devices in today's cars produce pulses of changing frequency that can be transferred along the vehicle's electrical system. This creates what is commonly called "alternator whine." It changes pitch with the speed of the engine. This particularly affects digital radios and can become worse with high power draws while transmitting. The usual solution has been to power the HT or mobile rig directly from the car battery. This method may be inconvenient, impossible, or may not eliminate the problem at all! The pulses can be transmitted directly through the battery, depending on how devices are wired into the electrical system.

Since my car's digital AM-FM stereo radio had no alternator whine and is connected to the fuse box, I knew that filtering was a solution to severe "whine" in an HT or mobile rig. The filter shown is very effective and works to a 10 amp current drain. It is extremely simple to build and costs about $21 with new parts, although junk box devices could also be used effectively. Larger capacitors and chokes can be used for higher current. It essentially duplicates the type of filtering used in high power stereo equipment where a flat DC voltage is needed with extremely little AC component.

Capacitors C1, C2 and C3 on the input side filter AC signals of low, medium and high frequencies. The Radio Shack 270-051 noise filter blocks AC components from the positive or negative side. I don't know the exact contents of the Radio Shack filter unit but resistance measurements show 0.3 ohms between each of the red and black leads, which is consistent with reasonably large chokes. There may also be some parallel capacitance. Connecting the two black leads together would eliminate the minimal voltage drop across the negative side choke but this does not appreciably affect performance. C4, C5 and C6 remove any residual AC signal. C4 is particularly large and helps to eliminate the effects of transient changes in the electrical system voltage. It's a good idea to tap into the fuse box at an accessory outlet or cigar lighter since these points are more likely to be independent of the ignition switch. The radio should be grounded as directly as possible to the car body, as the mobile antenna should be. For temporary operation, a cigar lighter plug alone can be used for both positive and negative leads.

Be sure to select the right size fuse for the radio that you plan to use. The filter can be built in any enclosure that you like. After soldering all leads together, I insulated the exposed wire leads with electrical tape and wrapped the entire assembly in thick cloth, placing it under the car seat. Good luck! RF

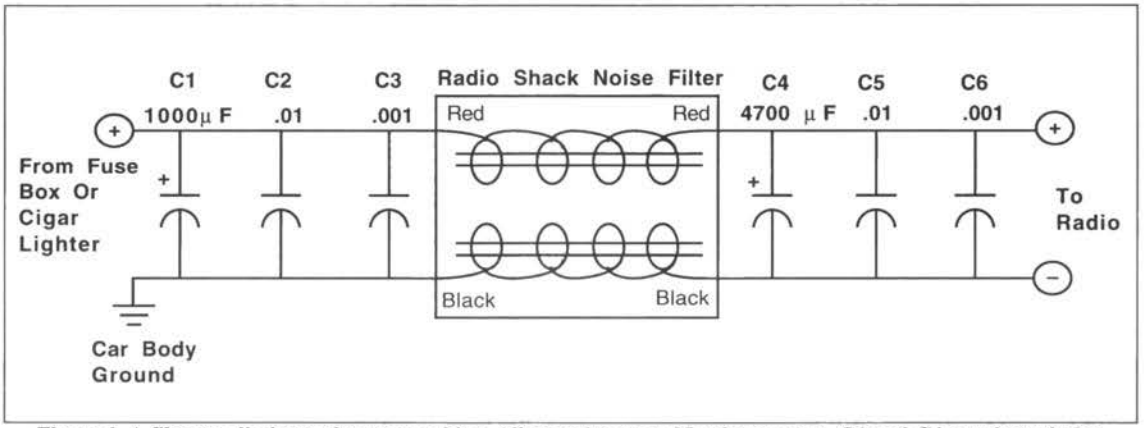

Figure 1. A filter to eliminate alternator whine. All capacitors are 35 volts or more. C1 and C4 are electrolytics.

itor the RF envelope. The gain control was advanced to the point where distortion was apparent. This occurred at between 90% and 100% modulation, depending on tuning and loading. Measured *peak* power output was roughly equal to the CW output for identical tuning and loading conditions.

On the air tests produced good results. No attempts were made to establish any DX records, the objective being to obtain critical reports on signal quality. Comments on the controlled carrier modulation system were typical. "Your audio quality is good, OM, but your carrier seems to be going up and down." Those operators familiar with controlled carrier AM signals gave good reports. Constructive, "on the air" help in finding the proper setting of the audio gain control was difficult to obtain. The proper point, verified by the scope, is just below the setting where audio distortion becomes noticeable.

There are very few complaints with the transmitter. The comments on the metering system cannot be taken too seriously since the system works and works well. The reduced output on 6 meters is more serious. However, since 6 meter coverage is a bonus anyway, we can afford to be philosophical and not look a gift horse in the mouth. The writer has personal objections to the RCA phono jack used as the mike connector and it is suspected that many users will change it to a type to fit their microphones.

All in all, the Knight T-60 is a very good buy. For the Novice, it is an ideal first transmitter, and it is very attractive to the more experienced amateur as an emergency or standby unit. The rugged construction and simplicity of the unit make it probable that this little rig will be in service long after more sophisticated equipment is "down for maintenance." RF

Reprinted from the March 1962 issue of 73 Amateur Radio.

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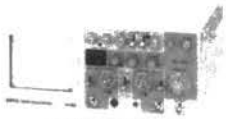

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